PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 020915PCT	**FOR FURTHER ACTION**	See Form PCT/IPEA/416
International application No. PCT/JP2004/000611	International filing date *(day/month/year)* 23.01.2004	Priority date *(day/month/year)* 27.01.2003
International Patent Classification (IPC) or national classification and IPC F02N11/08		
Applicant TOYOTA JIDOSHA KABUSHIKI KAISHA et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *sent to the applicant and to the International Bureau)* a total of 1 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the opinion
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☒	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
24.11.2004	02.05.2005
Name and mailing address of the international preliminary examining authority: European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Nicolás, C Telephone No. +31 70 340-4766

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/JP2004/000611

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
   - ☐ international search (under Rules 12.3 and 23.1(b))
   - ☐ publication of the international application (under Rule 12.4)
   - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1-67	as originally filed

Claims, Numbers

6-19	as originally filed
1-5	received on 24.11.2004 with letter of 19.11.2004

Drawings, Sheets

1/23-23/23	as originally filed

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

* *If item 4 applies, some or all of these sheets may be marked "superseded."*

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-19
	No:	Claims	
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-19
Industrial applicability (IA)	Yes:	Claims	1-19
	No:	Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Box V

Prior Art

1. The following document is mentioned in this communication:

D2: DE 100 50 170 A (DAIMLER CHRYSLER AG) 25 April 2002 (2002-04-25)

Claim 1

2. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 does not involve an inventive step in the sense of Article 33(3) PCT.

3. Claim 1 is vague and unclear (see comments on box VIII), and therefore is not possible to attribute it an inventive step.

4. Moreover, document D2, cited in the International Search Report, discloses a control apparatus of an internal combustion engine, comprising a combustion control unit which controls combustion in the cylinders at the time of stopping the engine. The aim of the control is to bring the crankshaft to a predetermined position when turning off the engine, so that the engine is better prepared for the next start up.
The braking method disclosed in D2 learns to bring the crankshaft to the predetermined position (see paragraph 0017: selbslernende Regelung). This implies that the inertia energy of the engine is controlled to be in a predetermined state, at a predetermined timing. If the end position of the crankshaft was not the desired one, the method learns and corrects the corresponding parameter, so that the next time the engine stops, the crankshaft reaches the target.

Box VIII

5. The application does not meet the requirements of Article 6 PCT, because claim 1 is not clear.

6. The feature "an inertia energy control unit which controls inertia energy of the engine to be in a predetermined state at a predetermined timing" is vague and unclear. In particular it is not clear what the inertia energy control unit consists of, to which predetermined state is referred to (it could be the cero state: motor stopped).

7. The feature "a stop control unit which stops the engine at a predetermined crank angle position by utilizing the inertia energy" is also unclear, and seems to define the subject-matter in terms of the result to be achieved, which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving the result: that the engine is stopped at a predetermined crank angle position.

CLAIMS

1. (Amended) A control apparatus of an internal combustion engine comprising:

a combustion control unit which controls combustion of the engine at a time of stopping the engine;

an inertia energy control unit which controls inertia energy of the engine to be in a predetermined state at a predetermined timing; and

a stop control unit which stops the engine at a predetermined crank angle position by utilizing the inertia energy.

2. The control apparatus of the internal combustion engine according to claim 1, wherein the inertia energy control unit controls a number of engine revolution of the engine to be within a range of a predetermined number of engine revolution.

3. The control apparatus of the internal combustion engine according to claim 2, wherein the inertia energy control unit controls the inertia energy by a motor for driving the engine.

4. The control apparatus of the internal combustion engine according to claim 3, wherein the combustion control unit starts the combustion of the engine while driving by the motor is continued, when a starting request occurs in the engine in a condition that the number of engine revolution is controlled to be within the predetermined number of engine revolution by the motor.

5. The control apparatus of the internal combustion engine according to claim 1, wherein the stop control unit stops the engine at the predetermined crank angle position by adding control force to the engine by the motor for driving the engine.

AMENDED SHEET